MENTORLINKS: Advancing Technological Education, 2005–2007

EDITED BY ELLEN M. HAUSE

Technological Education program, supported by the National Science Foundation and administered by the American Association of Community Colleges, are to provide technical assistance and networking opportunities for the purpose of improving community college programs that prepare technicians in the science, technology, engineering, and mathematics (STEM) fields. The program works with community colleges to establish connections for new ideas and relationships through networking opportunities at program meetings and national conferences; and to gain insight on building and sustaining new programs. MENTORLINKS features professional development opportunities for community colleges, with emphasis on beneficial mentoring relationships.

Through a national grant competition, 10 community colleges and 10 mentors working in diverse areas of technician education were selected to participate in a two-year grant project beginning in October 2005. MENTORLINKS brings together community colleges seeking program support and pairs them with an experienced mentor in their discipline. Mentors have strong credentials and extensive experience in planning and implementing advanced technology programs. Each college received a total of \$15,000 in direct funding for program development, and additional monies for travel support to attend national project meetings and conferences. The impact of the MENTORLINKS grant is evident in the program's outcomes. All 10 of the MENTORLINKS Colleges in the 2005-2007 cohort made progress toward improving targeted technical education programs. They developed new or strengthened existing programs in biotechnology, geographic information systems, information technology, aquarium science, manufacturing technology, multimedia technology, and science literacy. They successfully worked with their mentors in the following areas: curriculum and materials design and development, implementation of changes in ongoing programs to be more responsive to industry and employer needs, training programs for faculty and staff, student recruitment, marketing initiatives, engagement of local industry and employers, increased recognition and program support among administrators, and program assessment. Their efforts resulted in the creation of new departments, degrees, and workforce development programs.

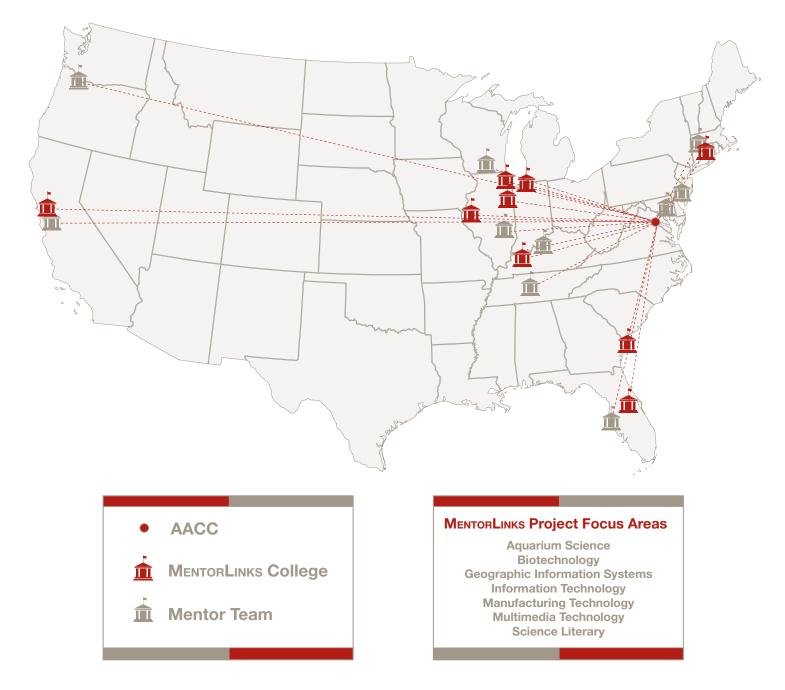
MENTORLINKS Colleges

City College of San Francisco, CA Lake Michigan College, MI McHenry County College, IL Oregon Coast Community College, OR Owensboro Community and Technical College, KY Seminole Community College, FL Spoon River College, IL Springfield Technical Community College, MA Technical College of the Lowcountry, SC Waubonsee Community College, IL





2005–2007 AACC MENTORLINKS COLLEGES



CITY COLLEGE OF SAN FRANCISCO

Applied Geographic Information Systems

The City College of San Francisco (CCSF) has adopted geographic information systems (GIS) for planning, marketing, and recruitment; developed customized courses for the workforce; and designed new curricula for students in computer programming. Alongside these efforts, GIS faculty worked to spread GIS across the college curriculum by offering a series of free lectures for the college community. The senior college administration, the Office of Research and Planning, and the marketing division were educated and advised of the value of GIS as a planning tool for many aspects of the college.

The MENTORLINKS grant assisted CCSF in creating the GIS Education Center for public employees and other Bay Area residents to learn GIS technologies The center (www.ccsfgis.org) serves as a point of contact for city and county workers, community-based organizations, and city nonprofits. Participants can gain access to GIS information, expertise, and technology that is directly applicable to the issues and concerns facing communities and industry.

CCSF leveraged support of public agencies and businesses to grow its workforce development program and to boost enrollments in the geography department's GIS courses.

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Mentors

Vince DiNoto Jefferson Community and Technical College, KY

Mike Rudibaugh Lake Land College, IL

- Two-sequence course in applied GIS for computer programmers and end users of GIS
- Customized GIS workshops offered through GIS Education Center
- Lecture series and workshops for faculty and students
- Presentation to San Francisco Unified School District counselors about future technology careers in GIS in a day-long event sponsored by IBM
- Map reading course for Goodwill's Truck Driving Academy and the San Francisco Conservation Corps using GIS tools
- Equipment purchase of GPS units for GIS Center and the CCSF Geography Department to support their new three-course certificate program

Lake Michigan College

Building a Science Literate Workforce

Science, technology, engineering, and math (STEM) are the four corners of Lake Michigan College's (LMC) drive to provide students with the skills they need to succeed in a science- and technology-based economy. To better meet this need and that of community members and area businesses in the realm of emerging technologies, LMC embarked upon a critical analysis of the college's science program. During the analysis process, several areas for growth were identified—occupationallyrelated science courses, science requirements in occupational degree programs, a comprehensive recruitment plan for the college's science offerings, and a local business needs assessment for emerging technologists. In addition, a science skills gap was identified in a significant portion of LMC's student population.

An initial version of a Science Skills Assessment was developed and tested during the 2006–2007 academic year. This test served as a base study and evaluation for science level placement. In future placement endeavors, this concept-driven assessment may serve as one of the components in a selection matrix. Those students who are not ready for college-level science courses will have the option to enroll in a transitional science course. The MENTORLINKS grant helped to lay the foundation for these activities.

MENTORLINKS also helped to influence a network of Michigan community colleges to establish the Michigan Community College Emerging Technologies Initiative (MCCETI). The MCCETI group meets regularly across the state and serves as a forum for leaders of Michigan's community colleges to discuss how to collaborate to educate, train, and prepare individuals for jobs in emerging technological fields.

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Mentors

Paul Drake and Vince DiNoto Jefferson Community and Technical College, KY

- Michigan Community College Emerging Technologies Initiative (MCCETI)
- Analysis of LMC's science program
- Science Skills Assessment test developed for student placement
- Transitional science course created with pilot delivery scheduled for fall 2008
- Commitment to developmental science courses, occupationally-related science courses, and science requirements in occupational degrees
- Chemical physics course in development for application to occupational programs using a hybrid-modular approach
- Nanotechnology workshop series conducted for Whirlpool Corporation and other industry partners

MCHENRY COUNTY COLLEGE

Video Game Programming and Design Degree

To meet the needs of the growing video game design and development industry, McHenry County College (MCC) created a new Digital Media department and obtained state approval for a new degree program, and three new certificate programs. Launched in fall 2006, the Digital Media program allows MCC students to combine games and game theory with the challenge of programming. With the addition of 12 new courses developed through MENTORLINKS, the program offers the following tracks and options: Digital Media–Animation track (AAS); Digital Media–Game Development track (AAS); Internet Game Programming certificate (Tech Prep); Animation certificate; and Game Development certificate. A second degree program in multimedia graphic arts is currently under development.

More than 100 students are currently taking courses through the new department, with 40 students declaring digital media majors. The college also reached out to local high schools and enrolled 17 students through its Tech Prep program.

In an effort to connect MCC's program with the social networks favored by teens and young adults, the college and its Mentor College, Camden County College, NJ, purchased software licenses for "islands" in Second Life, an Internet-based virtual reality. In conjunction with its Mentor College, MCC plans to use Second Life to develop a virtual museum for student displays of digital media projects, conduct virtual field trips, and build replicas of real-life places for group projects involving faculty and students.

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Mentor

Phyllis Owens Camden County College, NJ

- New Digital Media program created with two degree tracks and three certificate options
- Twelve new digital media courses developed
- More than 100 students taking courses in new department, with 40 declared majors in fall 2007
- Involvement of local high schools as part of Tech Prep program for Internet gaming
- Multiple workshops offered to middle and high school students in game programming, Flash, and digital storytelling
- Building of Second Life island to display student work and develop group projects
- New degree program in multimedia graphic arts under development

Oregon Coast Community College

Aquarium Science Program

In response to a growing shortage of qualified aquatic animal husbandry specialists, Oregon Coast Community College (OCCC) implemented the nation's first degree program in aquarium science. The goal of this technical degree program is to develop skilled and knowledgeable individuals for the aquatic animal care profession. The resulting skills can be applied to venues such as public aquariums, aquaculture ventures, ornamental fish businesses, and research facilities. The Aquarium Science program offers two curriculum tracks, a two-year associate in applied science (AAS) degree, and a one-year certificate of completion for individuals who already possess a bachelor's degree in a life science.

MENTORLINKS has played a significant role in expanding the knowledge base of the program staff through professional development opportunities and curriculum guidance. The grant's mentoring relationship was also instrumental in advocating for the program to Oregon's aquaculture industry. The leveraging of support and partnerships made through the MENTORLINKS project, and a previously awarded Advanced Technological Education (ATE) grant from the National Science Foundation, facilitated the construction of an aquarium science building for OCCC. The building also serves the Oregon State University's Hatfield Marine Science Center, an OCCC partner. The new facility adds aquatic instruction space for both institutions, saves the community college the expense of acquiring land and building seawater pumping systems, and increases OCCC faculty and student interactions with researchers and aquatic specialists.

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Mentor William Falls Crystal Beach, FL

- Three new aquaculture educational units and an aquaculture resource notebook
- Project team participation in the Aquaculture America Conference and other professional development workshops such as Pond Management, and Recirculating Aquaculture Systems
- Involvement of aquaculture professionals and personnel to discuss OCCC's needs and interests
- Eight new student internship sites: Blackwater Creek Koi Farm, Oregon Hatchery Research Center, Oregon Salmon River Hatchery, Oklahoma Aquarium, Ripley's Believe It or Not Aquarium, Landry's Aquarium, Texas State Aquarium, and Walt Disney World's Living Seas
- New aquarium science building under construction and scheduled for completion in early 2010

Owensbord Community and Technical College

Advanced Manufacturing for the 21st Century

Owensboro Community and Technical College (OCTC) is located in western Kentucky in the state's third largest city. Manufacturing is one of the area's largest occupational sectors, accounting for a significant portion of the regional labor market by employing 42,394 people. Local employers have strongly indicated a need for alternative delivery options that meet the flexible scheduling demands characteristic of manufacturing and that also provide training in the advanced skill sets involved in operating, troubleshooting, and maintaining systems.

As part of the MENTORLINKS project, OCTC redesigned its traditional industrial maintenance and electrical technology manufacturing curriculum into a modularized program, which combines hands-on labs with lectures students can attend on campus or via the Internet. The campus lab is staffed by a lab assistant during hours that fit working students' schedules. The revamped curriculum, which focuses on integrated systems technologies, fostered partnerships with five companies and prompted the college to devote \$1 million in federal and state funds to lab equipment purchases. Enrollment in the industrial maintenance and electrical technology program grew in less than two years from 38 students to 54 students and the number of incumbent workers using the modular, online program increased from 12 to 33.

OCTC leveraged its MENTORLINKS support to receive its first Advanced Technological Education (ATE) grant from the National Science Foundation. The college will use the \$597,000 ATE grant for its Discover Mechatronics–Next Generation Manufacturing project to support student career pathways and faculty professional development activities in Kentucky.

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Mentor

Rassoul Dastmozd Clark College, WA

- Ten courses and labs retooled into a modularized, online format for a total of 22 college credit hours
- Enrollment in the Industrial Maintenance and Electrical Technology program increased by 43% in 2006, steady enrollment levels in 2007
- Modularized curriculum piloted by 21 dislocated workers through Workforce Investment Act funding
- Approximately \$600,000 in equipment purchased to support hands-on learning
- New ATE grant funded Discover Mechatronics– Next Generation Manufacturing project

Seminole Community College

Recruiting Students to Re-emerging Information Technology Programs

In response to industry needs, Seminole Community College (SCC) worked to revitalize its current information technology (IT) programs, developed a focused student recruitment effort by using best practices created by other successful IT programs, and improved the retention and success rate for current IT students.

With MENTORLINKS support, SCC reconfigured four associate of science (AS) degrees into one AS degree in wireless technologies and programming. The new degree, which has several optional specializations, articulates to the University of Central Florida.

In addition, SCC hired a retention specialist to work with faculty to provide students with resource information, guidance, and the support to enable them to complete their education goals. The use of a retention specialist was such a successful part of the MENTORLINKS plan to assist the IT department that the college now funds the position. As an initial result of these efforts, there was an overall increase in enrollments from fall 2005 to fall 2006 of almost 15% versus continual decreases in enrollments during the past five years.

Although the IT department faculty was cut from 14 members to eight, MENTORLINKS facilitated faculty members' increased interaction with business and the community. Faculty offered free programs on Internet security and wireless home networks, judged science fairs, recruited students at college fairs, and raised the IT department's visibility in the community.

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Mentor

Gary Mullett Springfield Community and Technical College, MA

- IT curriculum modified; four separate AS degrees collapsed into one AS degree with a set of core courses and several specializations
- Elimination of duplicate courses between programs and departments
- Faculty participation in engaging local business leaders, high schools students, and community members
- Retention specialist position institutionalized by the college
- Enrollment increase of almost 15% from fall 2005 to fall 2006 in IT programs

Spoon River College

New Beginnings with Manufacturing Technology

Spoon River College's original project goals involved the design of a manufacturing technology program to meet the rising need for manufacturing technicians in its district. When personnel changes and the discontinuation of Spoon River's electronics program made initial plans unfeasible, the college decided to develop a maintenance certificate program for Pella Corporation, a leading employer in the region. By building a certificate program with an active business partner, Spoon River is able to develop a replicable model that can be adjusted to respond to other employers' needs and get students started on associate degrees. With MENTORLINKS guidance, Spoon River is also exploring an experiential learning program to link workplace learning to college structures.

Although the implementation of a manufacturing technology program has been delayed, Spoon River has continued to strengthen relationships with area businesses and universities. Western Illinois University is a new education partner that is committed to assisting with program development in manufacturing technology.

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Mentor

Dennis Faber TIME Center Community College of Baltimore County, MD

- Maintenance technology certificate
- Computer-aided design and computer training conducted for Pella Corporation
- Replicable certificate model that feeds into associate degree programs
- Strong partnerships with Pella Corporation and other local manufacturers
- Partnership with Macomb High School's EAST program and Western Illinois University's Manufacturing Engineering Technology program

Springfield Technical Community College

Advancing Workforce Education in GIS

Springfield Technical Community College (STCC) has a strong tradition in technical education. A few of the college's technical disciplines currently include geographic information systems (GIS) in their programs; but many others will need to include GIS as the technology becomes more widely used. In response to current and anticipated need, STCC established a geographic information technology (GIT) certificate with dual tracks in the business and engineering divisions with the help of the MENTORLINKS grant. The dual certificate uses existing information technology courses in the business division as well as GIS and other relevant courses in the civil engineering department. The 27-credit certificate includes three new GIS courses and case studies for civil engineering, marketing, and business students.

A noncredit GIS course was established to provide professional development for the local community who wish to include GIS in their careers. In addition, an online course was created to serve members of two additional regional community colleges located in Pioneer Valley as well as STCC students.

Working with the local research university and several regional colleges, STCC is ensuring that students will be able to transfer their GIS courses and GIT certificate credits. STCC promoted its new certificate to the local community with articles in the local press, presentations at area high schools, and through the creation of a local GIS Technology Task Force.

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Mentors

Mike Rudibaugh Lake Land College, IL

Vince DiNoto Jefferson Community and Technical College, KY

- New GIT certificate focused on civil engineering and business launched in spring 2007
- GIS Technology Task Force with representatives from local city and town governments, hospitals, and utilities
- Strong relationship with local GIS users group to facilitate student internship and employment opportunities, and to obtain curriculum input
- GIS workshops conducted at the National Center for Telecommunications Technology Curriculum Conference, and the City College of San Francisco
- Noncredit introduction to GIS course
- High school recruitment efforts and articulation agreements

TECHNICAL COLLEGE OF THE LOWCOUNTRY

Biotech Bridge Initiative

The Technical College of the Lowcountry (TCL) serves four rural counties in southeastern South Carolina. Through the MENTORLINKS project, TCL is pursuing plans for a statewide approach to a biotech curriculum to include hands-on laboratory training.

By starting with the development of a certificate-level biotechnology program, TCL is working to increase students' basic skills in biotechnology and to enhance the advancement of TCL graduates into further education and careers. The college developed partnerships with area businesses and secondary schools to assist with curriculum development.

With MENTORLINKS guidance, TCL offered a biotechnology workshop to engage students and faculty from local high schools, created a biotechnology advisory committee, updated the college's labs, and established a three-week Biotech Summer Academy that was successfully offered in July 2007.

CONTACTS

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Mentor

Bart Gledhill Bio-Link City College of San Francisco, CA

- Educational biotechnology workshop
- Summer academy for biotechnology
- Biotechnology advisory committee including area businesses and employers
- Engagement of area high schools
- Collaboration with state universities, technical colleges, and private industries

WAUBONSEE COMMUNITY COLLEGE

Enhancing and Strengthening Information Systems Technology

Faced with low enrollments, Waubonsee Community College worked to enhance and strengthen its information systems technology program to better align with the education and training needs of area employers. The program, at one point, included 62 information systems courses, four degrees, and 20 certificates in the areas of computer information systems, microcomputer systems, networking and security, and World Wide Web/Internet. In addition to revamping the curriculum, Waubonsee increased its relevance by building and leveraging relationships with the local IT industry.

With assistance from MENTORLINKS, Waubonsee assembled a focus group of local business professionals to examine and rank the National Workforce Center for Emerging Technologies (NWCET) IT skill standards. Combining this external input with internal insight gained from an in-depth faculty self-study, Waubonsee streamlined its curriculum to 53 courses, four degrees, and 13 certificates. Each IT degree now includes a newly established set of five core information systems courses, along with better defined elective choices.

The more logical curriculum alignment helped to increase IT enrollments from 629 students in fall 2005 to 893 students in fall 2007. With strong degrees in place, the college is turning its efforts to developing more aggressive student recruitment and marketing strategies.

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Team Member

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Mentor

Jim Johnson Nashville State Community College, TN

- IT curriculum streamlined to simplify course and degree offerings, strengthened content in response to employer needs
- Five-course core developed to bring consistency to the college's information systems degrees
- Focus group involving eight area businesses examined national IT skill standards and their importance in the local economy
- College Shadow Day hosted for 22 local high school seniors
- Enrollment increase of approximately 16% from fall 2005 to fall 2007 in IT programs

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Rassoul Dastmozd Clark College, WA

Rassoul Dastmozd began his personal journey in community colleges as a student. For the past 23 years, he has been associated with three community college districts as a faculty member, a department chair, an academic dean, and a vice president. At Clark College, Dastmozd currently serves as vice

president of instruction and workforce development and is responsible for all academic programming in five academic units and three satellite sites. Before joining Clark College, he was dean of the Applied Technology Division in the Eastern Iowa Community College District. Dastmozd brings experience from the private manufacturing sector and has provided industrial training to Cargill, John Deere Works, and Roquette. He holds a bachelor's degree in engineering technology from Southwest State University in Minnesota, a master's degree in educational administration from Drake University in Iowa, and a PhD from Colorado State University in education and human resources.

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Paul Drake

Jefferson Community and Technical College, KY

Paul Drake is chair of the Technology and Related Sciences Division at Jefferson Community and Technical College in Louisville, Kentucky. He has served as a co-principal investigator on two NSF ATE grants, KTEAM and SCANS, and participated as both a mentee and mentor in AACC's MENTORLINKS program. Drake is currently working on modularizing engi-

neering technology courses for the Kentucky Community and Technical College System with the goal of creating rich multimedia modules to facilitate flexible delivery of classes or portions of classes. He was originally a journeyman machinist before moving into small business and finally into technical education for the past 21 years.

Vince DiNoto

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Vince DiNoto

Jefferson Community and Technical College, KY

Vincent A. DiNoto, Jr., is dean of college and systemic initiatives and professor of physics and astronomy with Jefferson Community and Technical College in Louisville, Kentucky. He is a partner in the development of the National Geographic Information Systems (GIS) Center. DiNoto has expertise in curriculum design, modularization, and virtual learning, and has devel-

oped an applied physics class of eight online modules with video lessons composed of hybridized laboratories. He teaches more than 15 workshops annually in multiple formats and lengths through the Kentucky Information Technology Center. DiNoto's degrees are from Indiana State University. He has received numerous grants and awards from both public and private sources.

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Dennis Faber is the principal investigator for the TIME Center, a regional Advanced Technological Education Center funded by the National Science Foundation focused on manufacturing and engineering technology education and workforce development. He has been extensively involved in regional and

national workforce development initiatives with business, industry, labor, government, and educational organizations. Faber directed the DACUM Resource Center, a respected state, regional, and national curriculum and instructional design resource. He holds a bachelor's degree in secondary education, a master's degree in counseling, and has completed graduate coursework in organizational development, instructional design, and community college administration.

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William (Bill) Falls Crystal Beach, FL

Bill Falls has 30 years of experience in marine biology and aquaculture in three different states. He was the aquaculture program manager and associate professor at Hillsborough Community College in Tampa, Florida, for seven

years. Falls served as an Environmental Specialist II with Pinellas County Utilities Laboratory; an adjunct professor for the American InterContinental University for biology and environmental science; and a research administrator for the Florida Marine Research Institute's Stock Enhancement Research Facility. He completed a five-year National Science Foundation project on Aquaculture Live Rock that was published as a book chapter and a cover article of an international aquaculture journal. Falls received his MS in biology from Murray State University, and his PhD from the University of Southern Mississippi.

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Barton (Bart) L. Gledhill

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Bart Gledhill is the co-principal investigator and deputy director of Bio-Link, the National Advanced Technology Center in Biotechnology funded by the National Science Foundation. Previously, he served as a fellow for the

American Association for the Advancement of Science; scientist and deputy associate director of biomedical sciences and biotechnology for the Lawrence Livermore National Laboratory (LLNL); attending veterinarian for LLNL; and a tenured associate professor of clinical medicine for the University of Pennsylvania. Gledhill has published in nearly 200 scientific periodicals, presented more than a dozen named distinguished lectureships, and holds three patents and one copyright. He received his Doctor of Veterinary Medicine from the University of Pennsylvania and his PhD from the Nobel Medical Institute, Karolinska Institute, and Royal Veterinary College in Stockholm, Sweden.

Jim Johnson

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Jim Johnson

Nashville State Community College, TN

Jim Johnson is dean of information and engineering technology at Nashville State Community College. In addition to his administrative duties, he is the principal investigator for an NSF/ATE funded project called The Case Files. He has had extensive experience in curriculum development and project

management. Johnson also has experience in industry and served as a consultant to many of the nation's leading businesses and research facilities. He holds a PhD from Baylor University in educational administration, a master's degree in physics from the University of Wisconsin–Milwaukee, and a bachelor's degree in physics and mathematics from the Wisconsin State University–River Falls.

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Gary Mullett

Springfield Community and Technical College, MA

Gary Mullett, a professor of electronics technology, presently teaches in the Electronics Group at Springfield Technical Community College (STCC) in Massachusetts. A long-time faculty member and consultant to local business and industry, Mullett has served as department chair or co-chair for more

than 20 years. Since the late 1990s, he has been active in the NSF's ATE and CCLI programs as a knowledge leader in the wireless telecommunications field. A co-founder of the National Center for Telecommunications Technologies (NCTT) located at STCC, Mullett also played a principal role in the development of the innovative and long-running Verizon NextStep employee training program. The author of two text books, *Basic Telecommunications–The Physical Layer* and *Wireless Telecommunications Systems and Networks*, Mullett did both his undergraduate and graduate work in the Electrical and Computer Engineering Department at the University of Massachusetts at Amherst.

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Phyllis Owens

Camden County College, NJ

Phyllis Owens' career includes teaching and administrative appointments at Camden County College and Bucks County Community College. She holds a BFA degree from Moore College of Art, an MS degree from Drexel

University, and is currently completing her PhD. Her technology work broadly covers computer graphics, multimedia, Internet applications, virtual reality, 3-D simulation technology, the development of software applications, and the management of information and instructional technology resources. Her leadership has been instrumental in advancing the computer graphics program at Camden County College and making it one of southern New Jersey's premiere technology programs. She was honored by the Carnegie Foundation as New Jersey's Professor of the Year in 2005, and received the David R. Pierce award sponsored by Microsoft in 2004. Owens has been a much-invited speaker and consultant to many professional conferences, universities, public schools, and business organizations.

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Mike Rudibaugh Lake Land College, IL

Mike Rudibaugh's career started as a faculty member instructing earth science and geographic information systems courses at Lake Land College in 1996. Currently, he serves as a co-mentor for geospatial technology in the

American Association of Community Colleges' (AACC) MENTORLINKS program funded by the National Science Foundation (NSF). In addition, he serves on the advisory board for an NSF ATE planning grant to develop a National Center for Geospatial Technologies. He holds a BA from Eastern Illinois University in psychology, and an MA and PhD from Indiana State University in economic geography. His dissertation research focused on assessing the impact of location (urban vs. rural) and the resulting influence on the expression of community college entrepreneurialism.

Selected Web Resources

Advanced Technological Education Centers www.atecenters.org

Advanced Technological Education Projects www.ateprojectimpact.org

Faculty Development to Expand Excellence in Technician Education www.teachingtechnicians.org National Science Foundation www.nsf.gov/ate

AACC's ATE Program www.aacc.nche.edu/ateprogram

For more information on AACC's MENTORLINKS project, contact:

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